Supporting Regional Multi-Pollutant Analysis and Decision Making: Developing a Regional MARKAL Energy-Environment Model in New England

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As part of the U.S. Environmental Protection Agency (U.S. EPA) Global Change program, EPA-ORD-NRMRL has been developing the U.S. EPA MARKet ALlocation (MARKAL) technology database and model. This model is allowing NRMRL to develop long-term emissions scenarios by characterizing energy supplies, alternative energy conversion and end-use technologies, and energy demands. While such a model is useful on a national level, the U.S. EPA recognizes regional differences in technology use/deployment and the importance of state policy drivers in determining regional environmental emissions, which drive local air quality. Thus, NRMRL is supporting the regionalization of the MARKAL technology database with an effort to support state analysis of energy and environmental issues.

The U.S. EPA also recognizes the needs for integrated energy and environmental planning tools at the state and regional level. The advantage of a regional model is that it will accurately reflect the policy initiatives that are being designed and implemented by the states, using appropriate cost and performance characterization of the technologies that are available at the state and regional level. Through a co-operative agreement, NRMRL has been partnering with the Northeast States for Coordinated Air Use Management (NESCAUM) to develop a regional version of the MARKet ALlocation (MARKAL) model and technology database, NE-MARKAL. NE-MARKAL will be applied to assess the energy, economic, and environmental challenges presented by multi-pollutant management and regional policy commitments.

Because NESCAUM is an organization that provides substantial staff support to the New England States Air and Energy Directors, they make an excellent partner to explore the creation and utilization of these tools at a pilot scale. The effort, which has gained wide support and exposure throughout the New England region and beyond, will provide NESCAUM with a powerful tool to plan for evaluating both multi-pollutant management strategies across different sectors and other control programs that may be required to maintain and improve air quality in the region. By developing appropriate algorithms that provide a reasonable, credible, and fair economic assessment of cost-effective technology deployment, the NE-MARKAL model is allowing the New England states to better model and understand the impacts of their energy policies on the environment.

NESCAUM has received funds, in a joint grant with the University of New Hampshire, to expand NE-MARKAL into New York, New Jersey, and Delaware. Building on the lessons from NE-MARKAL, the U.S. EPA-NRMRL is planning on partnering with the bi-partisan Northeast-Midwest Institute and Ohio State University to build an Ohio-MARKAL model, with NESCAUM playing a supporting role to ensure compatibility. Future collaborations between the U.S. EPA-NRMRL, NESCAUM, and regional partners seek to replicate the linkages established in the Global Change Air Quality Assessment, where NE-MARKAL will be linked to emissions and atmospheric models, and the environmental benefits or burdens of local policies on air quality can be more thoroughly studied.